

Work Order ID 83642

83642

April-20-12 2:53:18 PM

Page 1

Item ID: D350-748-241TRN

Accept

N900040100

Setup Start

NS1

Revision ID:

Item Name: Crosstube Turning Detail

Stop

NS2

Start Date: 20/04/2012 Start Qty: 1.00

1

Cust Item ID:

Required Date: 04/05/2012 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: MCS

Date: 12/04/2012

Tooling: _____

Date: _____

Run Start

NR1

QC: _____

Date: _____

SPC (Y/N): _____

Date: _____

Stop

NR2

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

Draw Nbr.	Revision Nbr
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D350-748-241	F
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100 0.00

100 MORI SEIKI CNC LATHE LARGE

KC 12-4-24

Mori Seiki

Memo 0.00

Mori Seiki CNC Lathe Large 1-Fill tube with sand & install plugs on both ends as per Folio FA647

2-Turn first side as per Folio FA647

3- File transition lines smooth.

FOLIO REV: _____

DWG REV: _____

110 QC1- Inspect dimensions to dimension sheet 0.00

KC 12-4-24

110

QC

Memo 0.00

Quality Control

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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Picklist Print

April-20-12 2:53:22 PM

Page 1

Work Order ID: 83642

83642

Parent Item: D350-748-241TRN

D350-748-241TRN

Parent Item Name: Crosstube Turning Detail

Start Date: 20/04/2012

Required Date: 04/05/2012

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP Rev:A New Issue 08-03-06 DD verified by:ec

IPP Rev B Removed polish 08.04.02 EC verified by : DD

IPP Rev C Removed LPS-3 08.06.23 Ec verified by: DD IPP Rev D

11.02.24 as per dwg rev.F DD verf: JLM

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D6015-125		Manufactured	No			120	Each	42.0000	1	1			**

D6015-125

Crosstube Material

Use D6018-125

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
HALL	42	
61380	4	
72511	38	

32913

1 man.L 12/04/22

W/O:		WORK ORDER CHANGES					
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DART AEROSPACE LTD	Work Order:	83642
Description: Crosstube Assembly (AS350/355 High Aft)	Part Number:	D350-748-241
Inspection Dwg: D350-748-241 Rev: F		Page 1 of 1

FIRST ARTICLE INSPECTION CHECKLIST

Inspection Sheet Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	2.240	+0.005/-0.000	2.242	/		
	2.180	+0.005/-0.000	2.184	/		
	2.180	+0.005/-0.000	2.185	/		
	2.208	+0.005/-0.000	2.013	/		
	2.234	+0.005/-0.000	2.239	/		
	2.253	+0.005/-0.000	2.258	/		
	2.272	+0.005/-0.000	2.277	/		
	2.299	+0.005/-0.000	2.299	/		
	0.063	+/-0.010	.063	/		
	4.26	+/-0.030				
	R0.063	+/-0.010	-063	/		
	R0.50	+/-0.030				
SIDE B	2.240	+0.005/-0.000	2.240	/		
	2.180	+0.005/-0.000	2.185	/		
	2.180	+0.005/-0.000	2.185	/		
	2.208	+0.005/-0.000	2.213	/		
	2.234	+0.005/-0.000	2.238	/		
	2.253	+0.005/-0.000	2.255	/		
	2.272	+0.005/-0.000	2.277	/		
	2.299	+0.005/-0.000	2.299	/		
	0.063	+/-0.010	.063	/		
	4.26	+/-0.030				
	R0.063	+/-0.010	-063	/		
	R0.50	+/-0.030	-0			
	122.70	+/-0.060	122.70	X	tape	2021.6.02

Measured by:	<i>Mary L. Lee</i>	Audited by:	<i>DP</i>	Preliminary Approval:	
Date:	12/04/27	Date:	12-4-27	Date:	

Rev	Date	Change	Revised by	Approved
A	07.01.17	New Issue (P/O D350-748-201)	KJ/JLM	
B	12.02.02	Dwg Rev updated	KJ	<i>JL</i>

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Item	Qty	Part Number	Description
1	X	D350-748-241	CROSSTUBE ASSEMBLY (AS 350/355 HI AFT)
2	1	D6015-125	CROSSTUBE (OR D6018-125)
3	2	D3502-1	SUPPORT
4	2	D2856-400-710	ABRASION STRIP
5	1	AELS-1032-225	INSERT
6	1	NAS1149D0363J	WASHER (OR AN960JD10)
7	2	MS21920-20	CLAMP (PER DART SPEC. M-MS21920-20)
8	1	MS27039-1-10	SCREW

GENERAL NOTES:

- (F) 1) MATERIAL: MANUFACTURED FROM D6015-125 OR D6018-125
FINISHED LENGTH = 122.700±0.06
- 2) FINISH: MAGNETIC PARTICLE INSPECT PER DART QSI 038 4.2
CADMIUM PLATE PER AMS-QQ-P-416B, CLASS 1, TYPE II
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: DART PART NUMBER "D350-748-241" AND BATCH NUMBER ON INSIDE OF CUFF
PER DART QSI 044 6.4 (VIBRATING STYLUS)
- 7) WEIGHT: 29.85 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE, EXCEPT FOR Ø0.297 HOLE.
- 9) RUN CUTTER OFF PART WHERE INDICATED. BLEND OUT ALL EDGES FROM MACHINING
LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH. NOTE: ALL HOLES ARE DRILLED AFTER
BENDING.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 7 PASSES. MAXIMUM TUBE FLATTENING DUE TO
BENDING IS 6% BASED ON O.D.
- 11) HEAT TREAT TO MIN. 180 KSI PER MIL-T-6736 OR AMS 2759-1C AFTER TURNING. ACCEPTABLE TO
VERIFY TENSILE STRENGTH BY HARDNESS TEST PER ASTM E18 TO 40-45 HRC.
- 12) INSTALL D2856-400-710 ABRASION STRIPS WITH A GAP ON BOTTOM SIDE OF CROSSTUBE,
CENTERED OPPOSITE D3502-1 SUPPORT, PER QSI 035.
- 13) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE
OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES,
NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY.
CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. WHEN DRILLING HOLES EXTREME CARE
MUST BE TAKEN AND CAREFUL DEBURRING PERFORMED TO ENSURE A CLEAN HOLE WITH NO
CRACKING/CHIPPING/GROOVES.
- 14) TORQUE CLAMPS 60 TO 80 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT
NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.
- 15) MAX TWIST AFTER BENDING: WITH XTUBE LAYED FLAT ON SURFACE, THE DIFFERENCE BETWEEN
CUFF HEIGHTS FROM THE SURFACE MAY BE NO LARGER THAN 0.25 (ZN C1-3).

SHOP COPY

RETURN TO

ENGINEERING

UNCONTROLLED COPY

SUBJECT TO AMENDMENT

WITHOUT NOTICE

WORK ORDER

NO. 83642 MLJ

12/04/20

RELEASED
2011-01-08
AP

F	ADD HRC TEST OPTION (B8-1) PER PAR 09-040, ADD TWIST LIMIT (A8-1, C1-3), ADD D6015-125 OPTION (C8-1), STOCK DIM NOW MACHINED (D1-4)	CP	10.11.23
E	REVISE GENERAL NOTES; UPDATE TO CURRENT STANDARDS; RELOCATED FLAG #6 PER PAR 08-046 (ZN A8-3); ADD TOLERANCES (ZN C8-3, D2-3)	RF	09.09.30
D	MAG. PARTICLE AND CAD PLATE AS MFD.	CP	06.10.31
C	ADD CAD PLATING	CP	06.08.14
B	ADD D6018-125 & PRIME AND PAINT	CP	06.06.30
A	NEW ISSUE	CP	06.03.31
REV.	DESCRIPTION	BY	DATE
DESIGN	40	DART AEROSPACE LTD	
DRAWN	40	HAWKESBURY, ONTARIO, CANADA	
CHECKED	40	REV. F	
MFG. APPR.	40	DRAWING NO.	
APPROVED	40	D350-748-241	SHEET 1 OF 4
DE APPR.	40	TITLE	SCALE
DATE	10.11.23	CROSSTUBE (AS 350/355 HI AFT)	NTS

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8 7 6 5 4 3 2 1

D

D

C

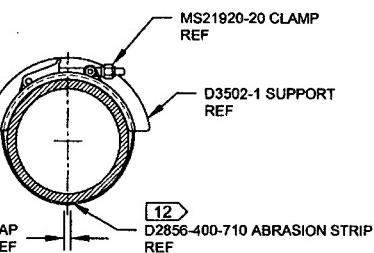
C

B

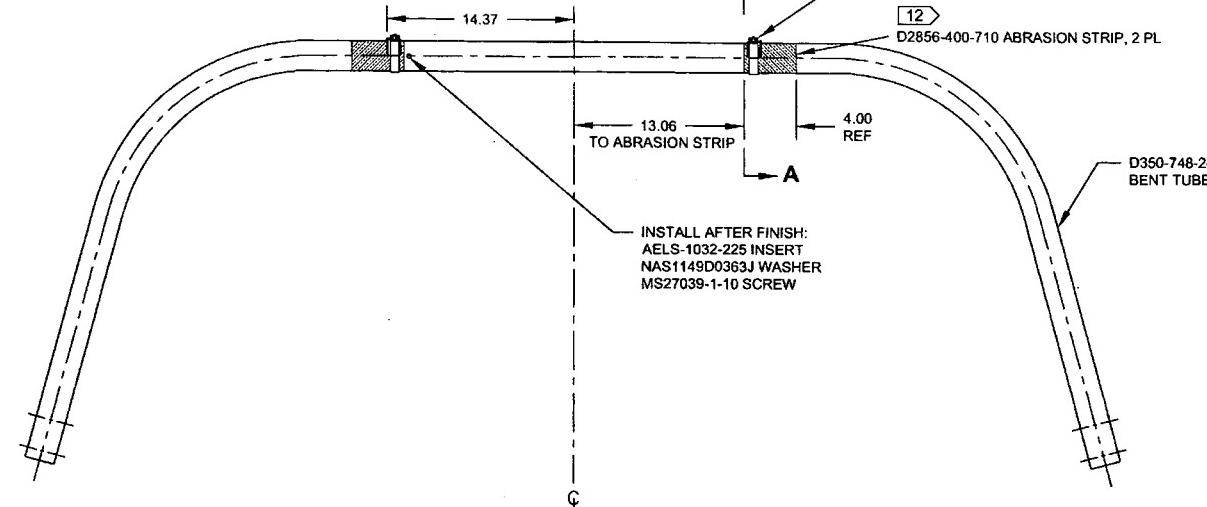
B

A

A



SECTION A-A D4-2
SCALE 4X



D350-748-241
ASSEMBLY DETAIL

RELEASED
2011-02-19
W

DESIGN	9	DART AEROSPACE LTD
DRAWN	9P	HAWKESBURY, ONTARIO, CANADA
CHECKED	13	DRAWING NO. REV. F
MFG. APPR.	12	D350-748-241 SHEET 2 OF 4
APPROVED	14	TITLE
DE APPR.	14	SCALE NTS
DATE	10.11.23	CROSSTUBE (AS 350/355 HI AFT)

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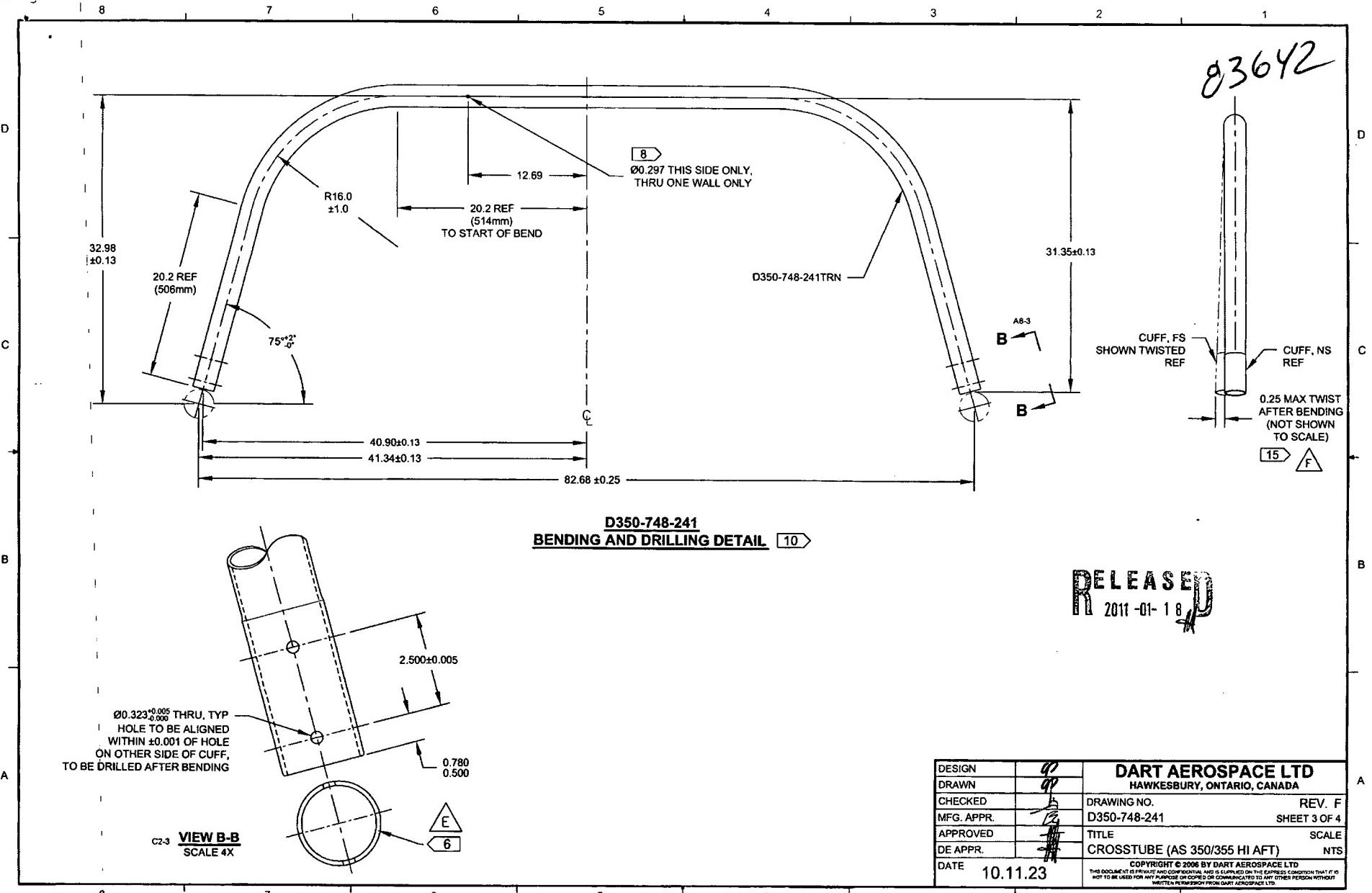
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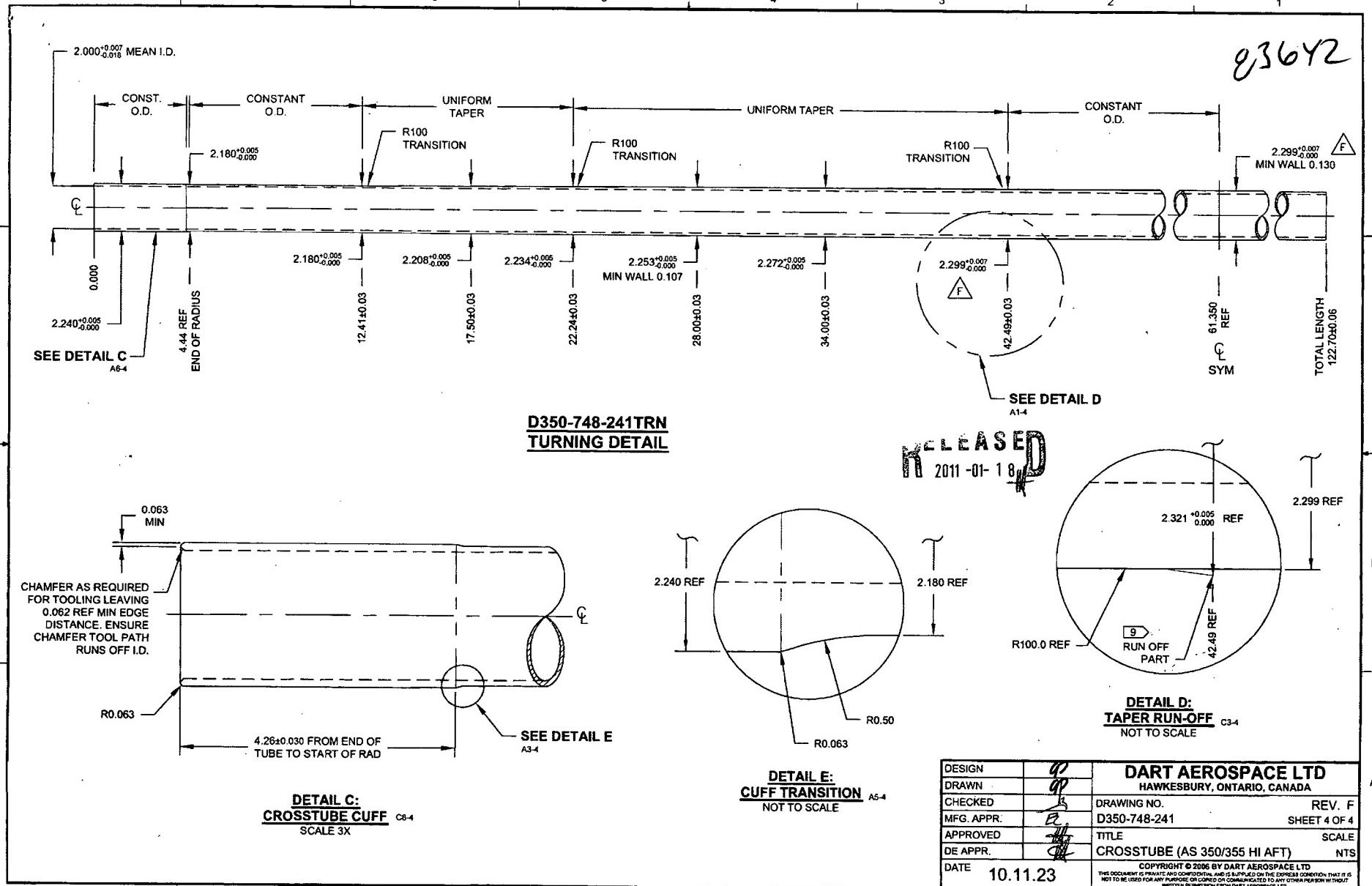
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Certification

SOLD TO

Dart Aerospace Ltd.
1270 Aberdeen Street
Hawkesbury, ON K6A 1K7

June 5, 2012

Metlab Shop Order No:	72197
Purchase Order:	16899
Description:	Crosstube
Part No.:	D350-748-141TRN, D350-748-241TRN
Quantity:	7 and 4 Pieces, Respectively
Weight:	500 Pounds
Material:	4130 Alloy Steel
Specifications:	Heat Treat to Minimum 180 KSI (MIL-T-6736OR AMS 2759-IC)
Note:	Need HRC 40 - 45

This is to certify that the above parts were processed as indicated above and conform to the specification requirements.

Results:

HRC 45 (218 KSI Tensile Strength, Converted)

METLAB _____
Quality Representative Mark Podob

MERCURY CONTAMINATION: During the heat treating process, testing and inspections, the product did not come in direct contact with mercury or any of its compounds nor with any mercury containing device.



Heat Treating and Metallurgical Consulting

Chris Provencal

From: David Shepherd <dshepherd@dartaero.com>
Sent: Monday, July 16, 2012 6:26 PM
To: 'Mike Petsche'; 'Chris Provencal'
Cc: Bill Beckett; Pat Smith; 'Linda Lacelle'
Subject: RE: NCR D212-664-201 & D350-748-201

Chris,

Looking at the photos, I think we should scrap both tubes.

David

From: Mike Petsche [mailto:mpetsche@dartaero.com]
Sent: July-16-12 1:59 PM
To: 'Chris Provencal'; 'David Shepherd'
Subject: RE: NCR D212-664-201 & D350-748-201

Honestly, they both look pretty sketchy. The wrinkles are pretty obvious

From: Chris Provencal [mailto:cprovencal@dartaero.com]
Sent: Monday, July 16, 2012 3:12 PM
To: David Shepherd
Cc: Mike Petsche
Subject: NCR D212-664-201 & D350-748-201

David, too NCRs:

D212-664-201

Two dings along the neutral axis, each near one of the supports. They are up to 0.010" deep . The dents are from shipping damage. Because the damage is from un unknown impact, I am inclined to scrap the tube.

REF. picture _IM_2848.jpg

D350-748-201

There is rippling on one bend. We used to get this all the time and have shipped out tubes with some rippling before. The tube is actually crushed less than normal, and is well within dwg tolerance, but the rippling makes it more noticeable.

I've been told to try to save every 350 I can, and I think this one is in line with what we would have accepted in the past. After paint, it's clear that you can see it visually as well as to touch. To me, this is more of a customer perception issue.

REF. picture _IM_2849.jpg